



**Anchoring and Black Swans:
Reconsidering Risk Aversion and the Future of Commercial Space**

"... the important thing is not to stop questioning..." (Einstein and later, X-Files)

Invitation-Only Experts' Workshop

Tuesday, March 22, 2016
8:30 am – 1:30 pm

Resources for the Future
1616 P St NW
Washington, DC 20036
Seventh Floor

AGENDA*

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| 8:30 am | Light breakfast |
| 9:00 am | Welcome and self introductions |
| 9:30 am | NASA perspectives (NASA Project Manager: Alex MacDonald, Senior Economic Advisor, Office of the Administrator) |
| 9:45 am | Overview of the project <ul style="list-style-type: none">○ Rationale, objective○ Longer run implications○ Assumptions and caveats |
| 10:00 am | Research to date <ul style="list-style-type: none">○ Providing context: previous research and assessment of safety and risk by other experts<ul style="list-style-type: none">▪ NASA and spaceflight▪ Non-NASA (black swans, federal agency cost/benefit risk assessment, value of statistical life approaches, "catastrophe" studies)▪ What our study is, and what it is not....▪ Expanding the context in looking towards the future -- what might be different in the coming decades? |
| 11:00 am | Coffee break |

11:15 am Research to date, continued

- Reasoning by analogy: examples, usefulness, limitations
- Reasoning from public attitudes
- Reasoning across other federal agency practices
 - Government risk conservatism
 - Cost and benefit risk studies
 - Value of statistical life and other agency findings for activities that are both commercial and government

Noon Lunch in room, with continued discussion

- The relevance and conclusiveness of analogies, public attitudes, and other agency practices as a basis for direction
- Discussion: Wither space exceptionalism at the govt and private sector interface?
 - Other avenues for research
 - Continuing a public dialog

1:30 pm Summary and adjourn

*Discussion will be within Chatham House rules (participants are free to use the information received, but neither the identity nor the affiliation of speakers nor that of any other participant may be revealed).

Resources for the Future (RFF) welcomes its guest experts to today's workshop. RFF is an economics research organization established in 1952 at the request of the President of the United States. RFF conducts independent research, primarily quantitative and using the tools of economic analysis. RFF's space economics research and policy portfolio includes studies of financial incentives to manage space debris and third-party spaceflight risk, network analysis of the dissemination of new scientific knowledge from the laboratory facilities of the International Space Station, and value of information techniques to assess the benefits of Earth observations in application to improving resource management.

Participants

Bill Anders*	Scott Farrow	Katrina McLaughlin
James Bennett	Mike Gold	Jim Muncy
Patrick Besha	Patti Grace-Smith	Scott Pace
Tim Brennan	Roger Launius	Rand Simberg
Tom Cremins	Molly Macauley	Rich Williams
Jason Crusan	Alex MacDonald	
Joe Dyer	Phil McAlister	

****Joining via phone***

About the Project Team

Molly Macauley. As Vice President for Research, Macauley provides intellectual leadership for a research staff comprised of world-renown experts in the economics of natural resources and the environment and maintains standards of academic quality and independence. She reports directly to the RFF President and RFF Board of Directors. As a Senior Fellow at RFF, Macauley has initiated and led RFF's research in the field of natural resources and new technology, emphasizing the role of technical innovation in global resource measurement, monitoring, and management particularly in the space/satellite domain.

James Bennett. With three and a half decades of experience as a co-founder and principal of entrepreneurial launch companies, particularly American Rocket Company (AMROC), and more recently as consultant to a variety of clients in the commercial launch and spaceport sector, Bennett is familiar with a wide range of safety-related regulatory issues and approaches from the operator's perspective. He has a long history as an actor in public policy formation on such issues in the US and elsewhere, including as a member of the Commercial Space Transportation Advisory Committee (COMSTAC) and recently in the Spaceplane Regulatory Workshop process of the United Kingdom Space Agency and UK Department for Transport. Bennett is Space Fellow of the Economic Policy Centre (London), and is a published author on issues of technology, society, and policy

Katrina McLaughlin. As an RFF Research Assistant, McLaughlin has provided research support and quantitative analysis in full collaboration on a variety of RFF projects. She has a BA in Political Science and a BS in Environmental Economics and Policy, both from the University of California at Berkeley.